The Builder.

SATURDAY, APRIL 15, 1854.

DIFFICULT as it is to comprehend by what energy and skill the work remaining to be done at Sydenham can be got through by the 24th of May, so much is accomplished during the intervals between our visits, that we have little doubt an excellent show will be made by that time. As the late report stated, the larger fountains cannot be played, in consequence of the impossibility of erecting the new "water-towers" before the expiration of the few weeks that remain. The sculpture for the fountains, for which designs had been procured, is also necessarily deferred: but although these omissions of objects about which expectation had been raised is to be regretted, there will be in every department of the great undertaking, features of interest and educational value, the good effects of which will, we doubt not, be reaped by the metropolis and the country during many years to come. The multitude of works of art already prepared and collected, if not calculated wholly to supply the place of foreign travel to the architectural student, will do much to lessen the deficiency to those who stay at home, while the opportunity of comparison affords a special value of its own.

Before setting down a few notes, on matters most interesting to our readers, let us remark, that the daily papers have of late rendered particular description on our part unnecessary. We can only hail with pleasure any increased attention to art amongst our contemporaries,—if the present improved tone is to be taken as evidence of it. Current opinions, even in subjects with which we concern ourselves, are greatly influenced through the ordinary channels, and we trust that the obligation of writers to understand the questions they discuss will be felt more than it has been,—so that on the one hand, hasty censure of works produced with much time and thought, and on the other, such indiscriminate and extravagant laudation as was witnessed in the case of the building in Hyde-park may be avoided. The opinions of professional architects may reasonably claim the deference which seems generally accorded to those of amateurs, or antiquaries, or ecclesiologists, or other invisible agencies which often work through the columns of the daily press. The prejudices in favour of particular styles set up at one moment and altered the next, and which architects have had no option but that of following this way and that, will, it is to be hoped, be influenced advantageously by the means of comparison which are, for the first time to any great extent, afforded at Sydenham. Though necessarily, still but partial representations of the few forms of architectural expression which they attempt to depict, the Fine Arts Courts may become the basis of much enlightened apprehension of the several points of difference in detail and general principle. In this way they may be of great service, both to architects and to the public.

We cannot but think that the love of real art in architecture would gain more complete hold of the public mind, if one style were exclusively followed to what might be worked out of it; or, supposing that a fresh style should be the result of the present opportunities of comparison, if that only were adhered to. That such a change is possible we think there is some evidence, from what has been occasionally effected by one man. Even the style of Sir John Soane is a case in point. A somewhat different opinion as to the precise tendency of the modern use of styles, may have been quoted in these pages. But we retain the belief that the want of definite direction in style, although it may be deemed unessential to the display of true genius, has much to do with the condition of art at any time. If architecture is ever again to become a breathing art, means must be found by which its inspiration may be caught, not so much by the learned professor, or the *virtuoso*, as by the general public. The judgment of merit may rest with those qualified by study and habits of thought; but the *object* of the art is surely, like that of poetry and music, to delight a larger circle of intellect. This its works cannot permanently do, so long as each is treated in a new, or a different language. Ideas themselves become unsettled; technicalities only can be brought before the mind; because the conception of the higher qualities of the art-production is not grasped before another style presents itself.

It was not by a specious show of novelty that were produced at once the highest excellence and the largest popular appreciation that history records, in those arts which chiefly are illustrated at Sydenham. The modern palate, satisfied only with strong drink, can scarcely realise the fact of such minute perception of delicate shades of beauty as existed amongst the ancient Greeks. We may dread, indeed, any turning up of fresh materials, when every discovery is applied not in the manner of capital laid out to interest, but as the latest novelty, attractive from its mere *difference* in form. It is the result of such a practice, that the beauty of mouldings and conventional forms, and of all that constitutes the especial character of our art, is not perceived by those to whom mainly, as we have contended, the art should be addressed. The eye is caught by an extravagance, and the faculty of taste is not called into play.

Yet it would be surely illogical to reason that the endeavour after intimate knowledge of styles, has been altogether erroneous. That "he who has laid up no materials can produce no combinations" is true of the architect as of the painter. But, there is one thing which seems to us most injurious, namely, that partial knowledge which it has hitherto been so difficult to avoid. Architects have been led to devote themselves to particular styles, and the means of comparison have not been easy. Britons as we are, and not the *least* rambling of nations, our professional brethren can take few opportunities of studying architecture but from books, and are not too well acquainted with these. We will not stop to inquire why this last condition of things is what it is,—though we may say, it appears to us that in plans, elevations, and sections, the mode of representation, essential as regards working drawings, has disadvantages never wholly mastered by the architect, however experienced. Even the perspective representation—based on the supposition that the eye is fixed, and takes in all at a glance—is, we venture to say, in some measure deceptive, and untrue to nature. It is clearly so in the case of interiors. Whether photography may supply the deficiency has to be seen.

Examination and comparison are, however, essential to clear impressions of relative merits, and to enable the architect to select that style in which there is most capacity of life, or rather to choose those characteristics of each which can be best combined for a new and harmonious whole.

The architectural courts at Sydenham then may have an advantage both for the public and even the most learned of our professional brethren. That there are, after all, some important omissions in points essential to a full comparison, could hardly, perhaps, be avoided. Columns, in a style of architecture like that of Greece, where greatness of scale was rather exceptional than an important feature of the effort after beauty, are of nearly the same dimensions as those of Egyptian architecture. An avenue of sphinxes a mile long is, necessarily, inadequately set forth in the north transept (under 300 feet); although the 20 feet in length of each sphinx equals the scale of the most important Egyptian examples—the great sphinx, of course, excluded. The gigantic figures, some 70 or 80 feet in height, tell sufficiently the fact of the colossal scale of Egyptian *sculpture*. But models of ancient Egyptians might be placed near the columns of the court, to show by comparison the real size of the original columns.

The world may visit the Roman Court without realising a true conception of the spirit of a style, in which the colossal was such an important element. The Greek Court, again, contends against the fact of a style formed principally by the architecture of exteriors: it is treated as the Greek might have worked with a similar purpose, rather than as he *did* form the structural arrangement of columns and entablatures,—which at Sydenham was that which had to be shown. The Mediæval Court is a museum of sculpture and ornament, but leaves "the long-drawn aisle and fretted vault," lofty nave and tapering spire, unrepresented. And what can we say of the Nineveh Court, where our daring friend who holds possession there, has cleverly elaborated a plausible scheme of polychromy from vestiges less important than were found in Greece,—what should we say, except that on all questions of treatment and chronology of Assyrian architecture, we expect to see it the battle-ground, where Fergusson and Layard will doubtless have to maintain opinions which should not be objected to by us? Whether the upper and lower portions of the Assyrian Court are discordant in character, is a question of taste, although still one to be taken into view in estimating the possible synchronism of dates; but we may remark that the immense antiquity of the bulls and lions of Nineveh, as compared with the architecture of Persepolis, is not to be taken for granted. We have heard a different opinion put forth by Mr. Wornum, in the valuable course of lectures at Marlborough House, and the identity of some of the chief features of the remains at Nineveh and Persepolis, is remarkable.

The architectural courts, indeed, generally are not to be viewed as entire reproductions of works of the styles which they are intended to illustrate. Still we expect much from the investigations to which they will lead. In fact, in the case of the Greek polychromy, and the Alhambra wall and ceiling decoration, opportunities are afforded which existing remains fail to supply. The Pompeian house, moreover, differs from its originals only in some parts of the plan, altered of necessity to allow of the circulation of the crowds which will visit it. Even now, and supposing that unconscious elbows, and more daring fingers, can be held away from the decorations of columns and doorways,—how are the white marble door-sills and the slabs of inter-columns of the peristyle, to be protected from the armed heel of the multitude, without destroying by the protection the effect intended?

As regards the building, generally, and the grounds, we will attempt to do little more just now, than set down the more striking features in the stage of progress which has been reached.

The last bays of the centre transept are glazed in, the great ribs having been erected without further accident, by the aid of a very strong scaffolding, carried up from the ground. The flooring is nearly all laid; the painting is far advanced; the Fine Arts Courts will not be backward; the Horticultural and Natural History departments are being set in order; and of the seven industrial courts under the direction of separate architects, that devoted to French

goods is the only one which is greatly behind-hand. The enclosures to some of these courts display elaborate arrangements of framed quartering in preparation for lath and plaster, which will ultimately receive considerable ornamental enrichment, contrasting with the temporary fittings of the building in Hyde-park. The Sheffield Court, on the west side, immediately north of the Pompeian house, is marked out by a circuit of iron girders on brick piers, as the first step in the execution of the design of Mr. G. H. Stokes, which has been set forth in a coloured lithograph. The Birmingham Court, which comes next, is under the care of Mr. Tite, but is not far advanced; and the Stationery Court, farther north, does not afford much better matter for description. It is in the hands of Mr. Crace, and is, we suppose, being designed by him. The Musical Instruments Court, the farthest south on the east side, from the design of Mr. John Thomas, is, it seems, intended to be an important work of the sculptor's art. Above the arches which form the enclosure are panels for relievos, and circular spaces for medallions, probably of heads of the composers. At the top is a cove and cornice of bold projection. Messrs. Banks and Barry have the court of printed fabrics, next in succession, which also has an arched enclosure; and Mr. Semper has that of woollen goods, which follows. Its present appearance shows that, unlike most of the others, it will be ceiled over, wholly or in part. This will, of course, lessen the light; and that effect has, we suppose, been considered. The enrichments of the architecture, shown on the drawings, are very good. All the courts are entered by doors in each side, and have an enriched front towards the nave. The remainder of the manufactured articles will be in the galleries, and in the wings which project eastward from the ends of the main building. These last are in themselves considerable works.—The machinery will be in the basement. In this department there seems very much still to be done.—Galleries, it will be recollected, do not come up to the nave, as in Hyde-park, except at the great transept and ends of the building; and with the exception of the narrow galleries which there are at the level of the springing of the great arched ribs. Mineral manufactures, hardware, and furniture, will probably be placed in what may be called the aisle, west of the Sheffield, Birmingham, and Stationery Courts. The court opposite the last of the three mentioned, was intended to be for French goods; but our continental friends have not yet placed a stick. We hope for the support of our new allies on May 24th, at Sydenham at least.

At the north wing of the two lately mentioned, much of the work is far behind-hand. The south wing will form the principal entrance from the railway terminus, and is further advanced. The terminus, equal in importance to that of an important town, is nearly completed. It is roofed over in two spans—the valley supported by a range of arches. The great ascent of steps was unavoidable, but will, we fear, be unexpected by some, for whose especial benefit a railway into the building may have been first proposed. Perhaps an inclined plane, and the means of winding up Bath-chairs, might even now be desirable additions to the other complete arrangements for the comfort of all classes.

The main entrance on the west side, will be by an enclosed porch, projecting from the building, and of the full width of the centre transept. The south end of the building has a large space, which is being enclosed as a royal entrance.

There are many points for consideration in the construction. Very thin columns of great height, in the basement story, support the iron girders and half-brick arches, and those which bear the ends of the heavy girders of the staircase have, we hope, been placed after very sufficient judgment. The inclined position of the sash-bars of the arched roofs we should have hesitated about, as liable in some cases to interfere with the ready flow of the wet: some of them are already much injured, in the nailing, at the ends. The wooden gutters also, for a permanent structure, we cannot but apprehend may, ere long, trench much upon the sum for annual expenses. However, it has been the fashion of late to carp at professional opinions; and we have so much to approve of in the undertaking generally, that we would avoid being misunderstood.

The south transept is beginning to afford a good notion of the effect of the botanical and horticultural departments. Numerous plants and flowering shrubs are grouped in their intended positions about the statue of Charles I. Stuffed animals are lying about, and some idea of what will probably be, after all, the most curious part of the display, is afforded by models in different positions, of individuals of savage races from several parts of the globe, and of the most opposite colours, habits, and physiognomy. What a town of schools will Sydenham become some day, if the use is made of the Crystal Palace that ought to be? Were one George Colman living then, he would surely have no longer to regard *all* the suburbs of London as regions of preparatory schools. The master will again walk with his disciples in the groves of the Academy, and truths in nature and science undreamt of in the Greek philosophy, will be amongst the "common things" of knowledge with the school-boy.

In the nave of the building, some of the larger works have already taken up their positions. The head of the colossal Bavaria is raised upon a lofty pedestal in the south nave. The most prominent object in the north, is the Choragic monument of Lysicrates. Whether this is to remain, may perhaps be unsettled, as the outlines of the monument, and of the horses and figures of the Monte Cavallo, were just lately "offered up" in the central transept. In the north nave, the Toro Farnese, a Gothic tomb, and some Irish crosses are amongst the objects placed.

The value of the wonderful collection of sculpture to students in that art, must be even greater than that of the architecture to architectural students. The casts, grouped with foliage, will also have an advantage in effect which is possessed by few of the originals.

From the elaborate character of internal decoration, the reproduction of which has been mainly aimed at, the public will see for the first time how much labour, and what unstinted outlay, have in all ages, with due consideration, and with a full recognition of economics, been devoted to art. At Sydenham, of course, real marbles are used in the architectural courts, only in some few exceptions, such as those we have referred to, and the coloured marbles of the Renaissance and Italian styles are exhibited by painted restorations.

Much is to be learned in one way or another, from the courts. The wall decorations which bear the authority of the great Raffaelle, beautifully reproduced, will astonish those who have studied at Marlborough House, and see them for the first time. Objects in the same composition are represented, some in elevation and others in perspective, from the most opposite points of sight, and without the slightest regard to position on the panel. Thus, an object represented as seen from above, is just as likely to be found at the top of the pilaster as at the bottom. Circular objects, which should have each side equidistant from the centre, are sometimes not so. We wonder, but we are reminded that the copies are faithful. Everywhere, so far from any strict adherence to the flat style of treatment, the representation of relief by shadow on a plain surface, seems to have been general. If the course lately advocated be the correct one, we may, culling beauty of form and colour from much of the Italian ornament, still effect the production of much in art which shall bear the impress of beauty, and yet possess a character of its own.

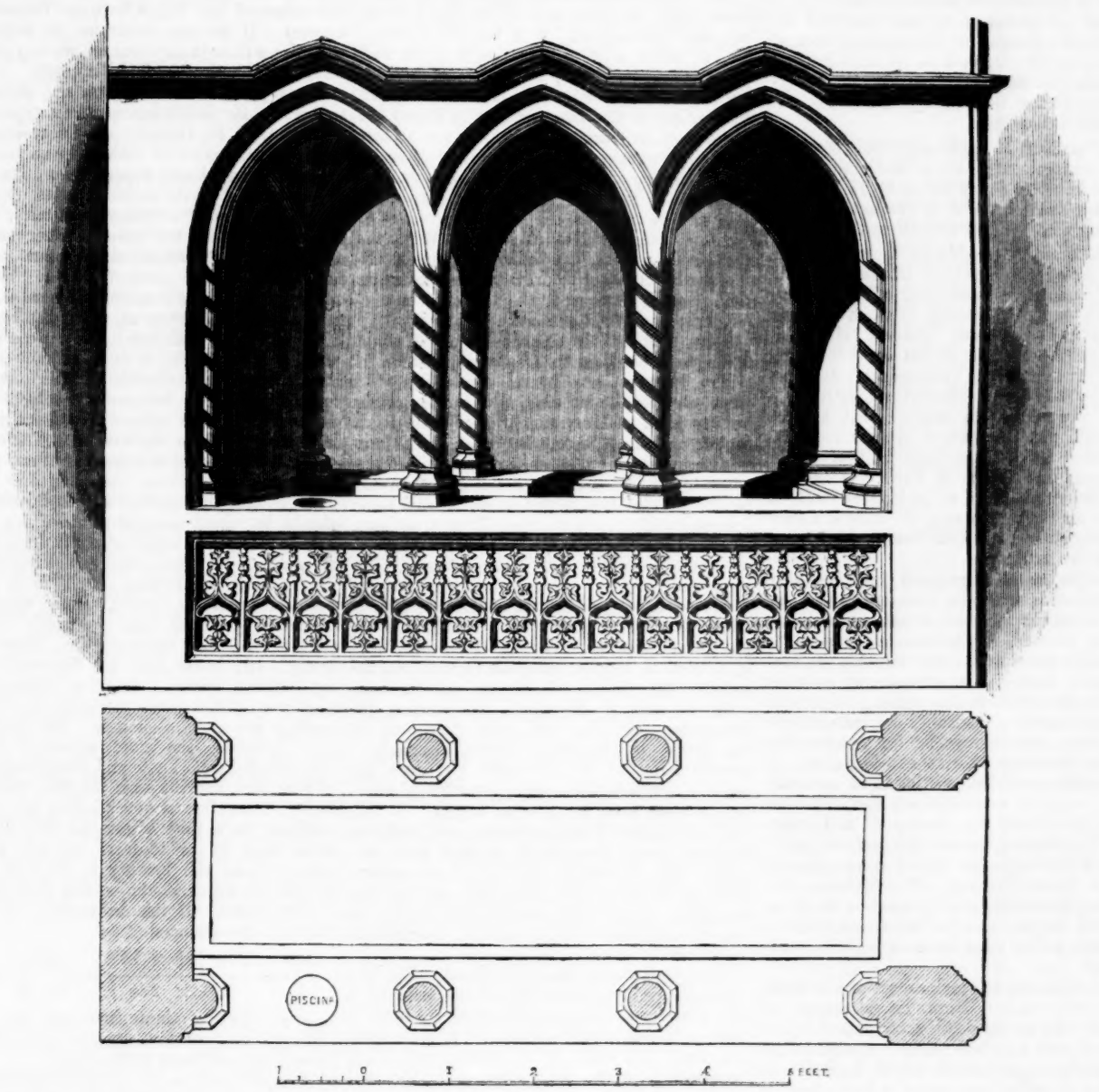
But we can merely indicate the nature of the suggestions which everywhere are presented to us. In the decoration of the Alhambra, with its peculiar combination of colour and relief, better presented to us by Mr. Owen Jones at Sydenham, than it could be even in his own careful drawings; in the front of the Parthenon by Mr. Penrose, in the questions raised by the experimental polychromy of the Elgin frieze, the blue back-grounds to sculpture, and to Romanesque and mediæval ornament, we might have suggestions for arguments on some of the principal questions which have to be settled by the architect-artist of this day.

The colouring of the building itself is greatly altered from that of Hyde-park, about which there was so much discussion; the shafts of the columns are painted red, and the result is, as it seems to us (though perhaps part may be due to the form of the roof and other features), that the building appears very much shorter, than it is by the real difference between the two structures. It would be wrong, however, to discuss this before the trees and shrubs, with which the red colour seems likely to harmonize well, are in their places. Any way, the effect of the interior is now very fine, and is so in Mr. Jones's original drawing.

But we must pass outside. The great reservoir at the north end is in active progress; the road and carriage-stands, for which great part of Dulwich-wood has been cleared away; the terrace-gardens and basins, the lakes, cascades, turfed slopes and gardens throughout the large tract of ground, are being proceeded with. The pedestals of the terrace, and of the balustrade which encircles the great fountain, have several marble statues fixed — copies of celebrated works. Next the main walk, opposite the centre transept, and eastward of the great fountain, the ground is prepared in a gradual slope, with steps, down which the water is to flow from ornamental structures at the top, and at the bottom in each case is to fall in a broad sheet over an arcade, into one of the two great lakes below The arcade forms the front of a loggia on the margin of the lake; so that there will be an agreeable place of resort at the back of the sheet of water. The architecture, as we have before now mentioned, is scarcely equal to the merit of the idea. What would not the architect of the water-gate at the bottom of Buckingham-street, Strand, have made of such an opportunity? How would Inigo Jones have delighted in bossy rock-work and weedy rustic-work? There is nothing here but a plain arcade, and a very ordinary cornice.

The lakes just referred to are of some extent. They are enclosed in a sort of amphitheatre, formed by lofty embankments, from which good views of the building are obtained. Beyond the embankments eastward, the tidal lake with its representations of geological formations is nearly completed, and some of the models of extinct animals, of which there will be a considerable number, prepared by Mr. Waterhouse Hawkins, are already in their places. The chief of the models are executed in Portland cement: a few are in stone.

On a mound, on the south side of the grounds, a circular structure is in progress, with columns and large arches. It is to form a rosarium. There is a large extent of ground to the north-east of the building, part of which is still unappropriated. The greater portion is being laid out as gardens. Here is another lake; and a rockery is in preparation.



SEDILIA, HOLY CROSS ABBEY, TIPPERARY.

There are in all three steam-engines, which are in this part of the ground, or near the reservoir. Steam-power is to be used to force the water from the artesian-well into the great reservoir, and to work the fountains in and about the building. The principal fountain, to play 200 feet high, and some others, will have to wait for the great towers.

It may interest our practical readers to learn what material is being used for the lining of the bottom of the great basins, or aquariums, one at each end of the building. Portland cement concrete is employed. Large slabs are cast in iron moulds, from which the slabs can be raised by a travelling crane. They are then laid on a floor of iron girders, and the joints are set and run with cement.—It seems to us that the number of staircases, lessened since the first plan was made, will be found insufficient. It is also perhaps matter for regret, that the company have not been able to establish a large hotel in conjunction with the building. The refreshment places in the neighbourhood are bad and expensive—like many others, indeed, at places of popular resort in the neighbourhood of London. It would be something for the company to achieve, to put an end to the present hotel system; and those who are disposed to use the collection as it might be used, would be glad to spend several days at Sydenham.

The directors may, however, well pride themselves on what they have done, if they are able to place a means of instruction, so powerful and so complete as the collection may become, within the reach of all classes; and more than that, if they raise a salutary opposition to those low vices which in our great cities are the resource of the laborious toiler and dweller in the pestiferous places called "the homes of the poor,"—those vices which are resorted to only because all have persisted in "ignoring," instead of directing and supplying proper aliment for a natural desire.

THE GALLERY OF ILLUSTRATION, REGENT-STREET.

Messrs. Grieve and Telbin have re-opened their gallery with "The Route of the British Army to the Seat of War," combined with their first and most beautiful work, "The Overland Mail." It includes a view of the Entrance to the Dardanelles, from a sketch by Lieut. O'Reilly, and, with the pictures of Constantinople, St. Petersburg, and Sebastapol, will serve to make its visitors better acquainted with the distant lands, now the topics of all talk, than Londoners are with their own "back slums." If Grieve were to paint "London Shadows," he would throw such a light into them that we should have them "flit away, and be no more seen."

SEDILIA, HOLY CROSS ABBEY, TIPPERARY.

The annexed sketch of a sedilia from Holy Cross Abbey, county Tipperary, Ireland, is a specimen of the style of architecture that prevailed in that country, about the latter part of the fifteenth century. It appears to have served for the double purpose of sedilia and piscina, perhaps as a canopy to a tomb also. Its style seems more continental than English, a characteristic which may be seen, from its flamboyant window tracery, to prevail throughout the edifice in which this sedilia is placed. The present floor (composed of loose soil and *débris* of the building), is 2 feet 3 inches from the seat.

The Abbey of Holy Cross in which the sedilia is placed, is situated on the river Suir, about two miles from the town of Thurles, county Tipperary, said to be founded in the twelfth century, by Cistercian monks, in honour of a reputed piece of the "true cross," bestowed on them by Pope Pascal II. the exhibition of which brought them in ample funds, to erect what must have been in its day a magnificent temple and adjoining cloisters. The charter originally granted by King John to the order, endowing it with large revenues, was confirmed and renewed by Edward I., Henry III., Edward III., and Richard II. and continued to flourish until the fifth year of the reign of Queen Elizabeth, at which period it was suppressed, and its extensive possessions granted to the then Earl of Ormond. R. Johnston.

ON A COMMONPLACE HOUSE.

SUPPOSE an architect to have directed his pupils to make designs for the principal floor of a commonplace house, such as are built in rows in London and its neighbourhood, the party-walls being 25 feet 6 inches apart.

He takes one of them.

"Yes," perhaps he might say, "this is a very common arrangement; here is on the first floor a room in front, 25 feet 6 inches by 17 feet, and behind this another room, 17 feet square, communicating with the first by folding-doors."

We will begin by considering the walls. The Building Act determines their thickness, but it is well to understand something of the principles which ought to govern us when we have to determine it ourselves. Soufflot calculated, from experiments made on the usual building-stone of Paris, that a thickness of $3\frac{1}{4}$ lines (French) would have sufficient strength for a building five stories in height; that is, the stone would not be crushed by such a weight. A well-burnt brick is at least as firm as the stone usually employed in Paris. If then $3\frac{1}{4}$ line, or about one-third of an English inch, be sufficient for the thickness of the walls of a lofty house, why should we build them in a brick and a half or two bricks?

In bridges, and in large public buildings with extensive vaults or domes, it is possible that the weight which the material would support without being crushed, may become an element to be carefully considered; but the fact is, that in common houses, and with sound common materials, the architect has nothing to do with it. The strength of his walls, determined from other causes, must always be far greater than would be necessary on this consideration. If we had built a wall half a brick thick and only one foot in height, we should not hesitate to put upon it the whole five stories of a Parisian house. If, however, instead of 1 foot, we had to make it 20 feet high, we should at once be conscious of its insufficiency. The thickness of a wall must, therefore, be in proportion to its unconnected height, *i.e.* to the space between two floors, rather than to the weight it has to sustain.

What, then, are the real causes of the weakness of thin walls? First, lateral action. A moderate blow might destroy any wall of 20 feet high and only 4 inches thick. A cannon-ball would perhaps go through it and do little mischief, but the equal impetus of a larger body in less rapid motion would extend farther, and make the surface bend. As soon as this takes place, whatever weight may be upon it, acts with immense force; for the power of the wall to support weight depends entirely on its perpendicularity; and the moment this is destroyed, the wall buckles and falls. The power of the wind against such a wall is also considerable. The wind is not a steady uniform force, but it acts by gusts, and thus produces a vibration, which diminishes the coherence of the parts; and the wind of one day, which appears harmless, may nevertheless, without any increase of strength, throw down the wall on the day following.

The second source of weakness is in the construction of the wall itself. The bricks are by no means perfect parallelograms; and though their inequalities are in some degree corrected by the mortar, yet still there is enough of irregularity in the bearings to insure the destruction of a very thin wall. This irregularity is greatly increased by the use of bond-timber and wall-plates, for the hardest wood is more compressible than stone; how much more so then the fir timber which is usually employed. On this account, it would be better to place the bond-timber in the middle of the wall, making use of detached wooden bricks for fastening the skirtings and the door and window-frames, and to employ oak or stone templets under the girders, without any continued floor-plate. Bond so placed could hardly be destroyed by fire; and even if so destroyed, would not sensibly weaken the wall. Modern practice seems often to make iron hoop, or something of the sort, supply the place of bond-timber; but we want a material less flexible across the openings. Plugging, in order to fix the woodwork, introduces an inequality of pressure, and is therefore a source of weakness.

The third circumstance injurious to walls arises from the weakness of the floors which they have to support. If a floor be perfectly firm, it rather adds to the strength of the wall by its steady pressure; but if it vibrate with every motion, these vibrations are communicated more or less to the wall, and tend to loosen the cohesion of its parts. If the joists or girders take a permanent set, this presses laterally against the top of the wall; and though by their adherence to the wall they may at first act as ties, yet, as parts of the woodwork decay or lose their hold, this effect ceases. While the cohesion is perfect, the tendency of the insufficient girder is rather to draw the wall inwards: when that is destroyed, the tendency is unequivocally to force it outwards.

I have said that the thickness of a wall ought rather to depend on its free height (*i.e.* on its height between any lateral connection with other parts of the building) than on the weight put upon it. Observation, rather than direct experiment, must determine what the proportionate thickness ought to be. I should be disposed to say that it should not be less than one-twelfth of this free height in an external wall: Internal walls may be thinner. It may, perhaps, be asked, whether, as the weight is indifferent, we are to make the walls of a warehouse, or of some great inn, of many stories, each perhaps 9 feet in height, no thicker at the base than at the top? This, I apprehend, would be carrying the theory too far. The higher the wall, even if divided at regular intervals into stories, the greater the chance of lateral action, especially of that of the wind; and besides, the connection of the wall with the rest of the house by successive floors, although it greatly adds to its strength, yet does not entirely counteract the various sources of weakness arising from its greater height. A wall 36 feet high and 9 inches thick would doubtless be very much stronger if divided into four stories than if carried up without any connection to the roof; but the defects arising from inequality of materials, and especially from the use of bond-timbers, would still be in proportion to the whole height.

One word more about the bond. We have recommended its use simply as bond, trusting to the occasional insertion of wooden bricks to form points of attachment for the joiner's work. As bond, its office is to remedy any slight inequalities in the foundation, or in the work itself; to obviate any defect arising from the inequality of pressure occasioned by the openings, and to connect the sides of the openings, so that, in the settlement of the brickwork, they should neither spread nor converge. For the last object, perhaps the shape of the bond is not of much consequence, but in inequalities of settlement, the disturbing action is vertical, and the principal scantling should be vertical also. One bond-timber occupying two courses would have more efficacy than four pieces of the common form of $4 \times 2\frac{1}{2}$.

A first floor implies a wall below as well as that which forms its own boundary, and I have therefore given above some notices of what the floor is to rest on, before describing the floor itself.

What is the nature of the proposed floor? *A triple-framed floor.* Well, but why *triple*-framed? The object in making a floor double, or at least one important object, is the prevention of sound from the upper to the lower; but this is as well obtained by the ceiling and floor joists attached to the girder, as by the additional intervention of binding-joists. It is true, that in this way the boards would lie in the same direction as the girder, and consequently, in many cases, across, instead of along the room, but in our present mode of covering the whole with carpets, this seems to be of little consequence.

The strength of a piece of timber placed horizontally to support a given weight, is in proportion to its thickness multiplied by the square of its depth and divided by its length. As, however, the weight to be supported may fairly be assumed to be in proportion to its length, we shall have for the formula to express the required strength $\frac{bdd}{ll}$; that is, the breadth multiplied by the square of the depth, and divided by the square of the length between the points of support. If we can determine by experience what this will be in any one case, we may discover what it will be in other similar cases.

Much has been written on the strength of timber, but the theory has rested on experiments derived from its tenacity and its resistance to crushing, on neither of which the sufficiency of a floor has any direct dependence. The knowledge required by the architect is its opposition to bending under a transverse strain; and on this point again we have experiments with which he is not concerned. We are told how much will *break* a piece of timber. What we want to know is, how much will bend it. If in a room like that before us, where the bearing is 17 feet, a beam will bend half an inch under any probable weight, it is manifestly unfit for its purpose. Experiments of this sort would not be expensive, because the object is not destroyed or even injured; yet I believe they have nowhere been carried out. The result of general experience, independent of any particular experiment, where the ends are entirely loose, is that the depth of a joist 2 inches wide should be about one-sixteenth of its length. Two inches seems sufficient width for a joist for all practical purposes, such as holding the nails firmly, and maintaining itself in a vertical position; and as much more strength is obtained by depth than by width, it is important not to increase the latter needlessly. In a house built for General Bentham by Edmund Aikin, I think at Highgate, the thickness of the joists was only $1\frac{1}{2}$ inch; and perhaps this may be enough. The thinner the joist, however, the more weakness is to be apprehended from knots and other irregularities of structure, and the more tendency there is to twist. I therefore assume 2 inches as a probable medium for a joist where the bearing is not more than 17 or 18 feet. In our supposed room, where the bearing is 17 feet, or 204 inches, the depth would be 204 divided by 16, or $12\frac{3}{4}$ inches. If this be correct, the general formula thus deduced

$$\frac{bdd}{ll} = \frac{2 \times 12\frac{3}{4} \times 12\frac{3}{4}}{204 \times 204} = \frac{325}{41616}, \text{ or } \frac{1}{128}$$

nearly, rejecting minute fractions; and we may take this as a constant expression applicable to floor joists not fixed at the end.

Proceeding from this as a fact established by experience, we may apply it to any simple joist of other dimensions. Thus, if we wish the thickness of our joist to be $2\frac{1}{2}$ instead of 2 inches, the length remaining the same, bdd would still be 325; but to find the value of d^2, we must divide this by $2\frac{1}{2}$, when d^2 comes out 130, and $d = 11\frac{1}{2}$. If the joist is to be only $1\frac{1}{2}$ inch thick, we find 325 divided by $1\frac{1}{2}$ to be 216, the square root of which, equal d, is fifteen nearly, the depth of the joist in inches. If with 2 inches we have a bearing of 15 feet instead of 17 feet, $\frac{bd^2}{l^2} = \frac{2d^2}{32400} = \frac{1}{128}$, and $d = \sqrt{127} = 11\frac{1}{4}$.

All this is supposing the joist to be perfectly free at the ends. If perfectly fixed, it would have double the strength; but this perfect fixing can only be obtained by carrying the joist beyond the point of support, and there making it secure. If so fixed, then we must have a different formula, twice as great as the previous one; that is, $\frac{bd^2}{l^2} = \frac{1}{256}$, where d would be equal to 9 inches. It would appear, then, that where the ends are perfectly secured, the length of bearing, divided by $22\frac{1}{2}$, will give a sufficient depth. In applying these calculations to practice, we must consider that even in bridging-joists we cannot depend on the ends being firmly fixed in every joist, and that in common joists a considerable degree of security is obtained by framing and spiking into the wall-plate. I should say, therefore, that in the latter case the formula might be reduced to $\frac{bd^2}{l^2} = \frac{1}{162}$, and the depth $\frac{1}{18}$ of the bearing, and in the

former, $\frac{bd^2}{l^2} = \frac{1}{221}$, and the depth $\frac{1}{21}$ of the bearing. In large timbers some other considerations occur, which I shall hereafter revert to.

Our formulas would again have to be altered if the joists were placed very far apart, or very near. I assume them to be 12 in. apart. In a room 25 ft. 6 in. long, we should thus require twenty-three joists, each 11½ in. deep $\left(\frac{204}{18}\right)$, 2in. wide; and supposing them to extend at each end 9 in. beyond the bearing, 18 ft. 6 in. long; and the quantity of timber in the whole would be 67 cubic feet.

We will now proceed to consider the quantity of timber in a double floor, where the joists rest upon a single girder. Such a girder, where we are not limited by the Building Act, would have to support half the weight of the floor, the other half being supported by the walls. As much, therefore, would rest upon it as upon twelve joists; and as the ends are not secured, the equation must be twelve times as great as that of a joist similarly placed, or, $\frac{bd^2}{l^2} = \frac{12}{128}$. We may suppose b, in this instance, to be 12 inches, as a common thickness for girders: d^2 would then be 325, and $d = 18$; and the quantity of timber 18 ft. 6 in. × 1 ft. 6 in. × 1 ft. = 27 ft. 9 in. The bearing of the joists would be 12 ft. 3 in. perfectly fixed at one end, imperfectly at the other. Taking the depth at $\frac{1}{10}$ of the bearing, it would be 7½ in., and there would be fifteen of them, each 27 feet long—27 × 7½ × 2 × 15 = 41 ft. 7 in. the amount of timber in the floor-joists; which added to the 27 ft. 9 in. of the girder, would amount to 69 ft. 4 in. without the ceiling-joists, and with the somewhat impracticable depth of 18 in. for the girder.

The Building Act will, I believe, not permit the common joists to enter into the party-wall. Within its limits, therefore, the girders would have to support the whole floor; and we cannot have fewer than three, which may be thus spaced:—

2·3	1·0	9·0	1·0	9·0	1·0	2·3

The spaces between the outer girders and the party-wall being one-fourth of that between the girders, the oversailing portion of the joists would have the same strength as the intermediate parts; but they may be connected at the ends by a 1-inch plank placed against the wall. The extent of floor supported by the middle girder would be as much as would rest on nine joists; the equation of strength for the girder will therefore be $\frac{bd^2}{l^2} = \frac{9}{128}$; and b being 12, and l as before 204, d turns out to be 15½. Now 18 ft. 6 in. × 15½ in. × 12 in. = 23 ft. 11 in. in each girder; and there would be in the three girders 71 cubic ft. 9 in. The joists in this case are 25 ft. 6 in. long, perfectly fixed; and $\frac{108}{21} = 5\frac{1}{4}$ in. will be the depth of the joist; 25·6 × 5¼ × 2 = 1 ft. 10¼ in. in each joist; and, as before, there would be fifteen of them, the whole quantity of timber in them would be 27 ft. 10 in.; making in all 99 ft. 7 in. The side girders would not have as much floor to support as the middle one; but that at one end would have to sustain the hearth-slab and its supporting arch; I shall not, therefore, enter into the calculation of what small saving may be made in this respect.

As 15½ in. is, however, rather an inconvenient depth for a girder, I will assume that we have four girders instead of three. These we should space 6 ft. apart, each supporting as much as five joists. Then $\frac{bd^2}{l^2} = \frac{5}{128}$; and the other dimensions remaining the same, d becomes 11½ in. or we may call it 12 in. Then 18 ft. 6 in. × 1·0 × 1·0 = 18 ft. 6 in. cube, in each girder, and 74 ft. in the whole number. Again, the bearing of the joists is 6·0; $\frac{72}{21} = 3\frac{1}{2}$ in. and 25 ft. 6 in. × 3½ × 2 = nearly 1 ft. 3 in. in each joist, and 18 ft. 9 in. in the fifteen. This added to that in the girders, amounts to 92 ft. 9 in. If we allow for the ceiling joists three-fourths of the quantity of timber in the floor-joists, we shall find the whole quantity of timber in a floor where there is only one girder, and where, consequently, half the weight rests on the side walls, to be

	Ft.	In.
Girder	27	9
Floor-joists	41	7
Ceiling-joists	31	3
	100	7

If we admit three girders, the quantities will be—

	Ft.	In.
Girders	71	9
Floor-joists	27	10
Ceiling-joists	20	10
	120	5

If there are four—

	Ft.	In.
Girders	74	0
Floor-joists	18	9
Ceiling-joists	14	10
	107	7

I apprehend that in these calculations I have given more strength to the girders than is usually thought necessary. My object has been to obtain an equality of strength in all parts; but in most floors the girders would be the first to give way, if the whole surface were loaded, to the destruction of the structure. In a house such as I am noticing, three out of the four girders might pass uninterruptedly from front to back, and thus gain a strength which would compensate for some diminution of the scantlings.

In a triple-framed floor, the girders remain as before, or rather they should be a trifle larger, for the floor itself is heavier, and some strength is lost by the framing: the bridging and ceiling-joists would be nearly the same. The binding-joists, then, are merely so much added to the quantity of timber without any accession of strength. I will not pursue this subject any further: enough has been said to show the great difference between the simple and more complicated floors, in the quantity of timber employed. It may be necessary to employ the latter, but the architect ought to understand what it costs.

I have said nothing about trussing the girders, simply because I know nothing about it. Tredgold maintains that it is of no use; but the experiments made by Mr. Barlow at the Royal Military Academy, on which he depends, lead to the palpable absurdity, that a king-post truss may be attended with some slight advantage, while a queen-post truss entails a considerable loss of strength. The scantlings employed were much too small, only 2 inches deep and 1⅞ inch broad; and one can hardly understand, in such a case, what the size of the trussing-pieces could be; and the cutting and framing could leave no sufficient solidity of materials. Perhaps better-conducted experiments may since have been made, but I am not aware of them.

I have said nothing of trimmers and trimming-joists, but in the two latter-described floors I have disposed the girders so as to have no need of them to the chimneys, nor I think to the opening for the stairs. Nor have I inserted any caution, which nevertheless is of some importance, that where joists or girders rest on a middle partition, that partition ought to be of the same material as the surrounding walls.

There is one circumstance still to be mentioned connected with the strength of timber, though it hardly comes into play in such a house as that before us. When timbers become very large, whether naturally so or built up, they require a greater proportional strength. It will readily be perceived, that a stick 1 inch square, placed over two supports at the distance of 100 inches, would remain without any sensible curvature; but that one of ten times these dimensions, *i.e.* 10 inches square, and with a bearing of 83 feet 4 inches, would swag very much, and almost perhaps break by its own weight. The strength of a material, where the forms are similar, is in proportion to the squares of the linear dimensions; the weight in proportion to their cubes. For example, if b and d be each 1, and $l = 10$, then the formula of the strength to resist a given transverse strain $\frac{bd^2}{l} = \frac{1}{10}$. Multiply each dimension by 10, and $\frac{bd^2}{l} = \frac{1000}{10 \cdot 0}$, or 10. In the first instance, the weight $bdl = 10$; in the second, 10,000.

On the boarded floor I have little to remark. The edges of the planks are sometimes tongued and grooved; sometimes a little under-cut and edge-nailed; sometimes rebated and laid on slips; the object being to prevent any open joints through the floor, or to fix the boards firmly, without showing the nails. They might be made of thinner stuff, and laid of two thicknesses, crossing each other; and in a case where there are no joists, or where the joists are covered with plaster, such a floor might be independent of fastenings, the edges being merely covered and kept down by the skirting. Such a contrivance, however, can find no admission at present into a *Commonplace house.**

J. W.

NOTES OF DOINGS IN IRELAND.

WE are told that a new cathedral is to be erected at Ballaghadereen, county Mayo, from the designs of Mr. J. G. Butler, Architect, Dublin; and that the plan provides accommodation for a large congregation.

Her Majesty's Board of Ordnance has determined on erecting twenty-six towers and batteries on the eastern coast of Ireland, in the neighbourhoods of Bray, Dalkey, Killiney, Sutton, Balbriggan, &c. At the present crisis this further fortification of the Irish coast has given rise to much *gossip* in the localities where the works are intended.

St. Mel's' Cathedral, at Longford, is to be finished. The skeleton of the building has been already erected, and we hear that the new works are entrusted to Mr. Bourke, architect. It is proposed, we believe, to expend about 3,000*l.*

The long-talked-of Custom-house and Post-office buildings at Belfast are now in a fair state of being matured. The plans have been prepared by Mr. Lanyon, and proposals for erection are being received.

The contemplated church of St. Bridget, Rowlestown, is to be built, and the plans have been lodged in Dublin for inspection of contractors.

The original site of the Magee College, at Londonderry, has been changed from Sir Robert Ferguson's to the field immediately opposite, and will be built at an elevation of about 60 feet above the level of the river, with the entrance front facing Rosse's-bay. The plan forms three sides of a quadrangle, with a frontage of about 195 feet, and a return on the northern flank of about 380 feet. On the principal story is a groined entrance-hall, 28 feet by 16 feet, formed in a central tower about 72 feet high, with semi-octagonal buttress, surmounted by crocketed pinnacle and finial at the side, and having principal staircase, reception and porter's rooms off same. To the left is the examination-hall and library, a spacious apartment, 68 feet long by 32 feet wide in narrowest part, and 42 feet high to hammer-beam of roof, which is to be open timber work, stained and varnished, constructed with one central and two side semi-arches, resting on corbels. This room is designed to contain 500 persons, and occupies one entire side of the building, being lighted from three sides, by double tiers of windows, with perpendicular tracery in the heads and transoms. To the right of entrance-hall is a corridor and students' staircase, with separate class-rooms for 100 students and 75 ditto respectively, robing-room, water-closet, &c. The first floor comprehends a museum with a corridor leading to class-rooms for 50 students and 150 students respectively, laboratory, &c. The north wing of basement contains porter's living and bed rooms, furnace, and heating apparatus-rooms, &c. &c. Wings of about 24 feet wide, finished with gables and flanked with pinnacled buttresses terminate the ends of entrance elevation, which consists of central

* To be continued.

tower and pseudo arcades carried up two stories and terminated by Gothic arches with hood and label mouldings, &c. The exterior will be of cut stone, with tooled and chiselled plinth course buttresses, mouldings, &c. It is expected the expenditure will be about 20,000*l.* Mr. Gribbon, of Dublin, is the architect, his designs having been selected in competition. The builder is not yet engaged.

THE CHURCHES OF LONDON.

THE interest which was excited by the view we published of the twenty-nine churches in the City of London threatened with demolition (p. 43, *ante*), leads us to think that views of the whole of the City churches will be acceptable, and we have accordingly thrown together on the opposite page twenty-two of these, and propose to give the remainder on another occasion.

Although we cannot exactly say of the churches of London as of a vast number in leafy England,—

> "How beautiful they stand,
> Those ancient churches of our native land!
> Amid the pasture fields and dark green woods,
> Amid the mountain clouds and solitudes;
> By rivers broad that rush into the sea;
> By little brooks, that with a lisping sound,
> Like playful children, run by copse and lea!
> Each in its little plot of holy ground;"—

Still they have each a story and a beauty of their own, and well deserve attention.

No. 1. shows the Temple Church, the circular portion of which was founded before the year 1185, in which year it was dedicated by Heraclius, patriarch of Jerusalem. The oblong portion now used for service is a beautiful specimen of Lancet, or Early English architecture, of the thirteenth century. The connection of this church with the Templars, the effigies in the "Round," and its story generally, must be known to most of our readers.

No. 2. St. Mary Magdalen's, Old Fish-street-hill, was burnt in 1666, and rebuilt by Wren in 1685, for the united parishes of St. Mary and St. Gregory.

No. 3. St. Alphage's, London-wall, was rebuilt in 1777, by Mr. Staines (afterwards knighted), retaining the lower part of the ancient tower, which may be seen inside. Mr. George Dance, jun. is said to have been the architect, but this is uncertain.

No. 4. Allhallows, Barking, is one of the most interesting old buildings in the metropolis, and contains several curious brasses and monuments. It is one of the few churches in the City which escaped the Great Fire.

No. 5. The Church of St. Magnus, London-bridge, has one of the best of the City steeples. The body of the church was built by Wren in 1676, but the steeple was not erected until 1705. The old church was one of the earliest victims of the fire. It contains a tablet to Miles Coverdale, —under whose direction the first complete printed English version of the Bible was published,—and some curious pictures in the vestry-room.

No. 6. St. Bartholomew's the Less, within the precincts of the hospital, has a curious interior, built by Dance in 1789 (who first destroyed the old building), and restored by the late Mr. Hardwick in 1825.

No. 7. St. Mary's, Aldermanbury, was burnt in 1666, and rebuilt by Wren as we now see it. Here lie the remains of the merciless Judge Jefferys.

No. 8. St. Benet's, Paul's-wharf, suffered like the last in 1666, and was rebuilt by Wren in 1683. Inigo Jones was buried in the old church.

No. 9. Christ Church, Newgate-street, is another of Wren's works, commenced in 1687 and completed in 1704. Here lie the remains of Richard Baxter, the well-known Nonconformist, and the learned Trapp, once its minister, still exhorts his congregation by his tomb,—

> "'Though dead I preach; if e'er with ill success
> Living, I strove the important truths to press,
> Your precious, your immortal souls to save,
> Hear me, at least, oh! hear me from the grave."

Nor would we overlook the tablet to John Stock, many years a painter at the Royal dockyards, who left 13,700*l.* for the promotion of religion and virtue, and the advancement of literature.

No. 10. St. Martin's, Ludgate, preserves the memory of the ancient gate. The old church was burnt, and Sir Christopher rebuilt it. The inscription on the font is a palindrome.

No. 11. St. Botolph's, Aldersgate, reminds us of another of the City entrances. It escaped the fire, but had become unsafe in 1790, and was then for the most part rebuilt at a cost of about 10,000*l.* The front next Aldersgate-street, merely a screen, is quite modern. Within the church there is a Gothic altar-tomb to the wife of Sir John Packington, 1563; and a cameo bust by Roubiliac to "Elizabeth Smith."

No. 12. St. Margaret's, Lothbury, stands over the ancient Wall-brook. Wren rebuilt it after the fire of 1666. The font is attributed to Grinling Gibbons.

No. 13. St. Peter's, Saffron-hill, is one of Sir Charles Barry's earlier works. It was built by Messrs. Souter, and cost, including schools, below 10,000*l.* The neighbourhood is "famous."

No. 14. St. Bride's, Fleet-street, was founded in very early times, as were most of those already mentioned; and here were buried Wynkyn de Worde, and Sir Richard Baker, who wrote "The Chronicles of the Kings of England." The church was rebuilt by Wren between 1680 and 1703. The steeple is second only to that of Bow. It was shortened 8 feet in 1764, when injured by lightning. Richardson, the author of "Sir Charles Grandison" and other works, lies buried here.

No. 15. St. Lawrence's, Jewry, was commenced in 1671, by Wren, the old church (and there was one here as early as 1293) having been destroyed by the fire. The details of the façade next King-street deserve examination. There is a memorial of Archdeacon Tillotson, who was buried here in 1694. The vestry-room is handsome, and has some pictures.

No. 16. Allhallows, London-wall, escaped the fire of 1666, but becoming dilapidated, was taken down, and the present church was built under the direction of Dance, the younger, between July, 1765, and September, 1767. The interior is a good specimen of,—what to avoid. Beloe, the translator of Herodotus, is buried here, and "Mr. John Patience, architect."

No. 17. St. Botolph's, Aldgate, was founded as early as William the Conqueror: it escaped the fire, but was pulled down in the following century, and the present structure was erected from the designs of George Dance, at the cost of 5,536*l.* 2s. 5d. There is a monument with sculptured effigy to Thos. Lord Darcy and Sir Nicholas Carew, both beheaded.

No. 18. St. James's, Duke's-place, was built in 1727, in the place of one consecrated in 1622-3.

No. 19. Trinity Church, Gough-square, is a modern structure of brick, built by Messrs. Haward and Nixon, from the designs of Mr. John Shaw. It was commenced in October, 1837, and finished in June, 1838. The body of the church is a hexagon, 47 feet 6 inches in diameter, with an octagonal recess, forming the chancel.

No. 20. The Church of St. Catherine Cree, Leadenhall-street, is a very curious structure of mixed style, rebuilt, as it is thought, by Inigo Jones. The old church, wherein Hans Holbein was buried, was pulled down with the exception of the tower still standing, in the beginning of the 17th century, and the present structure was consecrated by Bishop Laud in 1630-1. There is a monument to Sir Nicholas Throgmorton, 1570; and a tablet to one Richard Spenser, who having seen great changes, the plague and the fire, left behind him "a good name, a deare wife, a vertuous example, and three daughters."

No. 21. St. Peter's, in the Tower,—St. Peter, in chains,—is a romance in stone, a tangible piece of the history of England. Here lie the remains of many who lost their lives for not thinking as those who were in authority did. The church was built at the end of the thirteenth or beginning of the fourteenth century, but the windows, &c. are of a later date.*

No. 22. Wren's greatest work, St. Paul's Cathedral, the crowning glory of the City, has the finest outline, perhaps, of any building in the world. It is to be hoped that the corporation will strain a point to keep a clear space at the end of New Cannon-street, so that this noble exterior may be seen. We are well aware that it is not a trifling sacrifice on the part of the corporation which is being asked for,—the whole plot in question would probably produce 50,000*l.* or 60,000*l.*—but it is so important to maintain the open space, that we again commend the matter to their most serious consideration.

OPENING ST. PAUL'S.

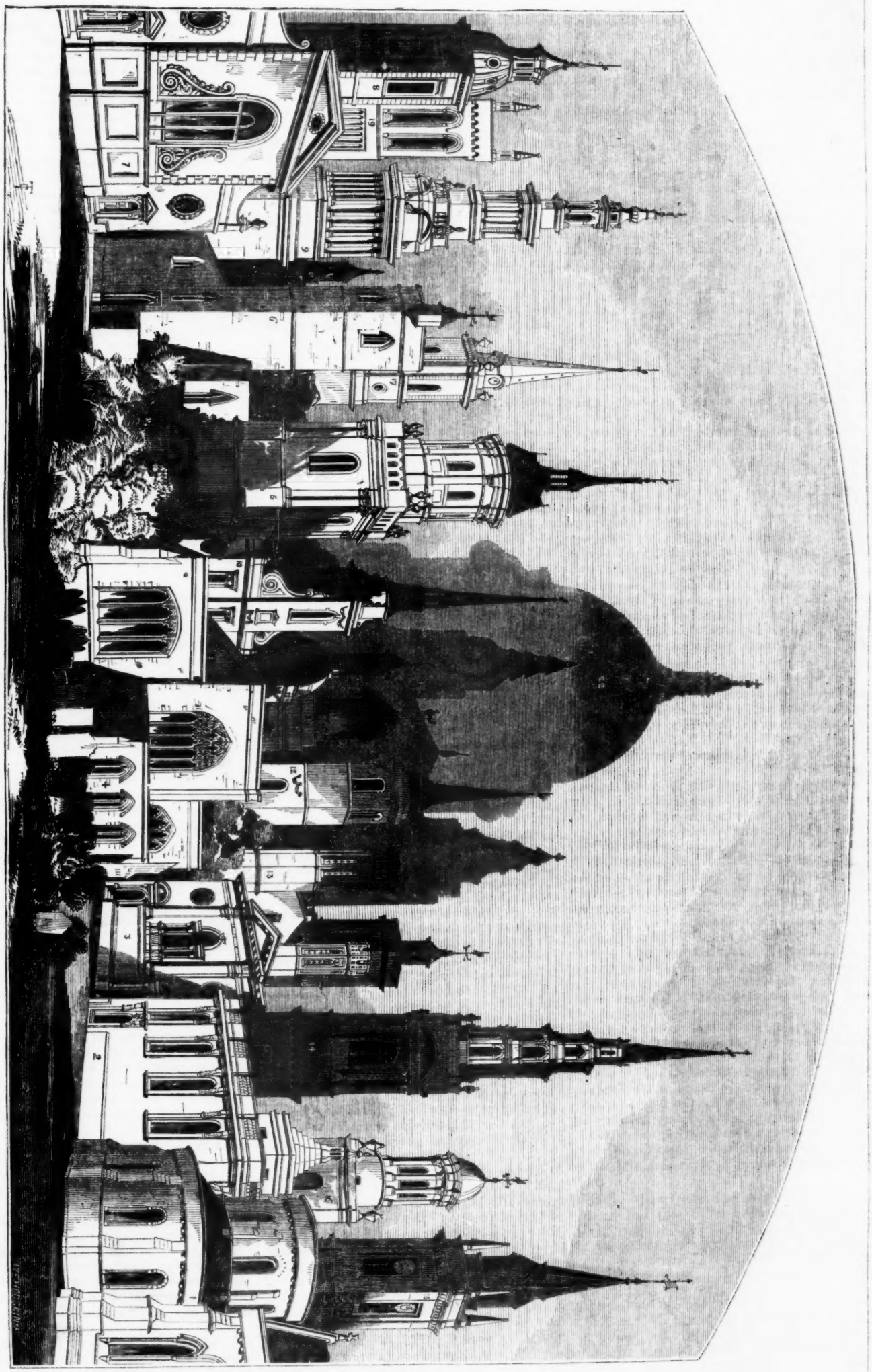
OUR OPEN SPACES.

ALTHOUGH your attention has been already called in a very sufficient manner to the opportunity which now exists of preserving one of the finest *coup d'œils* which Europe can afford, I feel sure that you will allow me to follow in the steps of a fellow-citizen, in urging, through your columns, the attention of those in whose power the matter rests, and endeavour to enlist the warmest sympathies of the passing public in favour of the suggested opening to St. Paul's.

I am so far utilitarian, that I confess I do not shudder at the idea of removing some of the city churches which may now be useless, or even of sacrificing Temple-bar, the time-honoured boundary of the City, if the public convenience will be thereby promoted; but I do earnestly desire, where no public inconvenience will result, that the few master-pieces of art which we possess should be displayed to the best advantage; and that we should have some of those spirit-stirring monumental effects which are unhappily so few in this vast but smoky and somewhat monotonous metropolis; for whilst in population and material riches no capital in the world can vie with us, there are few indeed of the great continental capitals that cannot produce more and finer points of view, more noble and striking grouping of monumental works, than we can.

I, sir, am also a citizen in the most literal sense of the word. I was born, and have lived, and still am located in a narrow City-lane, but I am proud of the great architectural beauties which the City contains, and regret that they should be shut up and concealed as they are. I know from my intercourse with my neighbours, that there are many who take the warmest interest in this matter; and I believe that not only their sympathies but their purses would testify to their earnest desire to preserve, for the admiration of generations to come, the magnificent perspective of St. Paul's which is now opened up to us, and which it would be a reproach to us again to shut out from view. EDWARD I'ANSON.

* We may refer those who desire fuller particulars of these buildings to "The Churches of London." By George Godwin. 2 vols. 8vo. with plates.



CHURCHES IN THE CITY OF LONDON.

THE PREVENTION OF SMOKE.

INSTITUTION OF CIVIL ENGINEERS.

ON the 4th inst. the first paper read was "On the Prevention of Smoke in Engine and other Furnaces," by Mr. James Simpson, jun.

The annoyance of smoke incidental to the increase of habitations and to the extension of manufactures, in all cities and large towns, had been noticed reprehensively even as early as the time of Charles II. in whose reign it was proposed to legislate on the subject, and in 1697 Dr. Papin devised a scheme for forcing air down a pipe immediately above the incandescent fuel, to induce more perfect combustion.

The attention of parliamentary committees was devoted to the subject in the sessions of 1819 and 1820, and again in 1843, when a very complete history of the subject was given in the report, with a clear recapitulation of the scientific evidence, recommending a freer admission of air to the furnaces as the "great, if not the only principle, for preventing smoke." In 1845, two other committees reported, "that opaque smoke issuing from steam-engine chimneys might be so abated as no longer to be a public nuisance;" and in 1853 the "Smoke Nuisance Abatement Act" was passed, and was ordered to come into force in August, 1854. This Act renders it compulsory on owners of engines and furnaces to provide means for preventing the emission of opaque smoke, and it applies also to steam-vessels navigating the Thames above London-bridge.

The paper took no step towards a solution of the difficulty beyond advocating the employment of anthracite and Welsh steam coal, not only on account of the absence of opaque smoke, during their combustion, but also on the ground of the economy arising from their great evaporative power.

A second paper, "On the Management of Furnaces, and the Prevention of Smoke," by Mr. C. Wye Williams, was read.

The object of this communication was to endeavour to remove the mystery which had hitherto obscured what was asserted to be one of the simplest and best understood processes of nature, namely, the combustion of the gaseous products of coal. A short analysis of the chemical details connected with the subject was given, to show that the existence of flame did not imply the combustion of gas,—that it was but the preliminary state of high temperature of the numerous atoms of the carbon of the gas, which was caused by the intense heat, produced by the combustion of the other constituent—the hydrogen.

In effecting the combustion of the gas generated from the coal in a furnace, the first process was merely mechanical, and consisted in bringing the atoms of the gas and those of the air into the most intimate state of mixture; such mixture being the *sine quâ non* of subsequent chemical union. The mode or means by which this chemical admixture could be effected in the most rapid and intimate manner involved all that art or human ingenuity could do towards producing perfect combustion.

As to the mode of effecting this mixture, or of bringing together the atoms of air and gas, reference was made to the Argand gas-burner, as supplying a good illustration; the only difference being, that in the Argand burner, the gas was projected among the air in numerous small jets, or films; whereas, in the furnace, the process was reversed, the air being brought to the gas, in a similar manner, by means of numerous orifices.

In both cases the effect was identical, and might be compared to the rose of a watering-pot, or of an artificial "*jet d'eau*;"—namely, the producing, on the instant, the largest area of surface for mutual and atomic contact. Models and drawings were exhibited, showing the facility and simplicity with which, both in land and marine furnaces, hundreds of small orifices were introduced, so as to effect the most intimate mingling of the air with the gaseous products of combustion.

It was stated, as the result of considerable experience, that it was a matter of perfect indifference in what part of a furnace or flue the air was introduced, provided this all-important condition was attended to, and satisfied—namely, the effecting the mixture of the air and the gas before the temperature of the latter was reduced below that of ascension or kindling. This, according to Sir Humphrey Davy, should not be under 800° Faht. as ignition could not take place at a lower temperature,—that fact being the principle of safety in the miner's lamp.

Previously to the introduction of the tubular, in place of the flue system, in marine boilers, it had been supposed, that the introduction of the air, on the Argand principle, by a perforated plate, behind the bridge, satisfied all that nature required, in producing perfect combustion.

The next point considered was, as to the quantity, or gross volume, of air required, and the area of aperture necessary for its introduction. On this head, it was stated, that a great practical error had been frequently committed, as it had been stated that it would suffice if the aperture should be equal to $1\frac{1}{2}$ square inch for each square foot of fire surface in the furnace, in the case of single furnaces; and of but half a square inch, or ·5-inch for each square foot of grate-bar surface, in case of double-furnaced boilers.

These proportions were now asserted to be wholly insufficient, and in fact, were not sufficient to allow of one-fourth the required quantity of air to pass. In practice, it had been ascertained, that for bituminous coal, from 4 to 6 square inches were required, for each square foot of furnace; and, for anthracite, from 2 to 4 square inches, according to the quality of the coals, and the amount of draught.

Cleansing Smoke.—We have seen an arrangement in operation at Earles-court, Old Brompton, whereby the smoke is beaten by wheels into water, and escapes almost transparent. The patentee proposes to use the carbon left in the water commercially. The arrangement is simple, and the advantage would seem to be very considerable.

At Leeds a meeting has been held, convened by the Leeds Engineers' Smoke Prevention Society, whereat the object of the society was stated to be to promote the consumption of smoke, but at the same time to defend such of its members who may be summoned, as they deem unjustly, for non-consumption of smoke. On any member receiving a summons, a deputation of the committee are to proceed and examine into the circumstances, and if after such examination they consider that the causes were beyond the control of the person charged, then he will be defended at the expense of the society; but if the non-consumption of smoke arose from neglect, then the person charged is to be left to bear the consequences. As to the remedial agents to be employed, the opinion expressed was unanimous that all the apparatus now in use was comparatively worthless. By the application of smoke-consuming apparatuses in the furnace, the draught was deteriorated. By deteriorating the draught they necessited harder firing, and consequently a greater consumption of coal, whilst by checking the current they produced a more rapid action upon the boiler bottoms, involving greater liability to accident from explosion, and adding a material item to the cost of wear and tear. "Those evils existed under careful management, and pertained to all smoke-burning patents yet in use, and when they were not so attended to the evils were considerably increased. The most effectual mode of consuming smoke was stated to be—plenty of boiler room, careful firing, and good draught."

Smoke from Common Grates.—We are told of an invention by Mr. J. Jeffreys, of Leeds, said to be applicable to a common grate, without any alteration for the purpose of burning coke in house fires; by means of which smoke is to be done away with, and a saving of fuel effected. A sliding partition, like a moving "flower," is fitted in front of the fire-place, and has another plate of metal suspended to its lower edge at an angle of about 60 degrees, having about one-third of its surface in front of the partition, and two-thirds behind it. This inclined plate has an important action, and is termed an "inflector," as it turns the current of air with force upon the top and front of the fire, keeping them brilliant. By giving this inflector a polished surface, it becomes also a powerful reflector of the heat which, as an inflector, it excites. Sheet tin will answer well for common purposes; while, for the very poor, thin sheet-iron will give all the effect of the inflector, though not acting as a reflector. It is said the whole apparatus might be adapted to a poor man's grate for 4s. while the economy of fuel, after repeated trials, is found to amount to from a fourth to more than a third.

PROVINCIAL NEWS.

Chester.—The rebuilding of the Blue-coat Hospital, including schools and almshouses, under the direction of Messrs. Morris and Hebson, architects, is fast approaching completion. A statue of a scholar, in Caen stone, by Mr. Richardson, is on view in one of the new almshouses, prior to its being placed in a niche in front of the new school buildings. It is life-size, in the costume of the period (the school was founded by Bishop Stratford, A.D. 1700), and is also a portrait statue from one of the boys, who was sent to London to serve as a model for the work.

Grimsby.—Both the Manchester and East Lincolnshire Railway Companies are contemplating extensive alterations and improvements on their works at Grimsby. The Manchester Company are about to make extensive alterations in the fishing dock, to fence in the entire works, and to erect a dock-master's house and railway station on the dockworks. The companies seem to have come to a better understanding with each other: their respective goods departments are to be united at the Manchester warehouse, and the East Lincolnshire warehouse is to be converted into an engine-house, for the Great Northern Company.

Lynn.—The south chancel window in St. Nicholas's Chapel has just been filled with stained glass, as a memento of a late town-clerk of this borough. The subject illustrated is the parable of the talents as given in the 25th chapter of Matthew, and consists of a series of eight compartments; executed by Warrington.

Yarmouth.—The Wellington Pier has been completed, and visitors have now the advantage of an agreeable promenade. The dimensions of the pier are—length, 703 feet; width, 30 feet; with an oval end 100 feet in width. From the gates there is a rise of 8 feet in 450, the remainder being on the level. At the oval end there are landing-places and ladders for boats. The esplanade has been extended about 60 feet, passing the entrance to the pier a distance of 10 feet. This esplanade, the *Norfolk Chronicle* thinks, should be still further extended, ultimately as far as the monument, and a row of handsome houses erected facing the sea.——The waterworks at Ormesby are slowly progressing under the superintendence of Mr. Parsons. The reservoir is about $4\frac{1}{4}$ miles, and the filtering-beds about 6 miles from the town. The water, after passing from the Broad through the filter-beds, will be pumped into the reservoir, and from thence conveyed in the pipes to the town. The filter-beds and reservoir are not yet completed. The main pipes, of 9-inch diameter, are laid from the town to the reservoir. Three months since the Board of Health advertised for fire-plugs, and the tender of Mr. Ayres, on behalf of the company, was accepted. The same description of hydrants will be used as at Norwich. There will be about seventy hydrants in different parts of the town. In another year, the supply of good filtered water, under pressure, and obtainable at all times, must be a great benefit to the town.

Cliffe.—New national schools are in course of erection on a piece of land abutting the churchyard (given by E. W. Peel, Esq. of Maidstone, for the purpose), from plans by Mr. Cooper, architect, Gravesend, as approved by the Lords of the Privy Council. The walls are of Kentish rag-stone, and the roofs are to be deal, open timbered, and stained. The repairing the fine chancel of Cliffe church has just been completed, the ceiling removed, and the walls plastered with blue lias not jointed. It is much to be regretted, says our correspondent, that a new east window has not taken place of the present unsightly appendage. Mr. H. G. Austin, of

Canterbury, was the architect employed by the rector, Archdeacon Croft.

Salisbury.—It has been resolved to endeavour to have the chapter-house of the cathedral here restored, as a memorial to the late Bishop of Salisbury. The estimated cost, inclusive of stained glass for the windows, is 5,000*l.* A committee has been appointed with the dean and chapter at the head of it.

Taverstock.—It is intended to take down and rebuild the parish church of Taverstock, near Salisbury, with a view to better accommodation.

Praston.—This is also proposed with respect to the parish church of Praston, near Weymouth, and applications have accordingly been made to the Salisbury Diocesan Church Building Association for grants in aid.

Wellington.—The Black Down Hills monument committee state that the original building has been thoroughly and substantially repaired, raised to a height of 170 feet, that it has stood the late boisterous weather undamaged, and that the base is the only portion not yet completed. They report that the contract (with Mr. Aust, on Messrs. Goodridge's plan) and incidental expenses amount to 1,140*l.* that the subscriptions received amount to 1,020*l.* leaving a sum of 120*l.* now wanting. This would be further increased if a fence wall were built to protect the base. The committee appeal to the county of Somerset to supply the deficiency, and to complete the memorial. It has been determined, as we before said, to enlist the services of the ladies of the county in raising the sum still required. Lady Hood and other ladies, according to the *Bath Chronicle*, have already expressed their readiness to subscribe 10*l.* each.

Taunton.—A house agent at Taunton informs us that, to a man of capital, and having a taste for building, there is a fine opportunity of realising a handsome return for his money in that immediate neighbourhood by erecting some convenient residences. There are building sites, he says, to be had with immediate possession on reasonable terms.

Pembroke.—The battery at the western extremity of the dockyard has been completed, the guns received having all been mounted. The fortification on Thorne Island is advancing rapidly, and will be completed without delay. Its guns command the entrance to the haven, and will cross their fire with the battery at Dale Point, on the northern shore, where considerable works are in course of progress. 20,000*l.* are required to complete these defences, which will be mounted with guns of the heaviest calibre on traversing carriages.

Holyhead.—Upwards of 1,500 men are now employed at the Holyhead new harbour works: a dozen locomotive engines are in use; and about 4,000 tons of solid rock are deposited daily. The Great North Breakwater, which is to be 5,000 feet in length, and running out to Platters buoy, is expected to be finished in August.

Liverpool.—Some buildings, situate in High-street, and extending to Exchange-street, Liverpool, were sold by auction a few days since for 20,000*l.* The site is required by an insurance office, and the land fetched at the rate of 50*l.* per square yard, the highest price, it is said, ever paid in Liverpool for land.

Tranmere.—A meeting was lately held in the new school, Limekiln-lane, to inspect Mr. Hay's plan for a new church, and receive the report of the building committee. The Rev. Mr. Arthure stated that, while there were only four places of worship, there were thirty houses licensed for the sale of intoxicating liquors.—Mr. Harden stated, that the lord of the manor had given upwards of an acre of the best building land in the neighbourhood for a site; and his brother, Mr. John Orred, the sum of 3,000*l.*—viz.: 2,000*l.* for the endowment, and 1,000*l.* to build the minister's house. The subscriptions amounted to 1,600*l.*; and, for 500*l.* more, they might erect a church without chancel or spire; but to complete the building in its integrity would require the sum of 3,300*l.* Resolutions were carried unanimously approving of the plans.

Preston.—The works at the new parish church are progressing favourably. The chancel is so far completed that it is expected to be ready for service in little more than a month. The windows at present are all filled with plain glass, but ultimately the chancel will contain a collection of stained glass windows, several gentlemen having intimated their intention of presenting them to the church. Sir H. Bold Hoghton, bart. will give a window for the large one at the east end, and others have been promised, two by Mr. E. C. Lowndes, one by Mr. John Addison, one by Mr. R. Newsham, and one by Mr. J. Bairstow. The stained glass which formerly occupied the east window in the old chancel will now be placed in the side; and as the new chancel and chancel aisle will be lighted by seven windows, there are now six stained-glass windows already at the disposal of the building committee. The monuments, including that to the memory of the late vicar, are all now in their places in the chancel, the flooring of which is also laid. The works in the other portion of the building are also being carried on with considerable activity, and the workmen have commenced the alteration of the steeple, preparatory to the erection of the spire.

Coventry.—We are informed (says a local paper) that the restoration of the exterior of St. Michael's Church, in this city, is about to be proceeded with at once, from the designs of Mr. Scott, architect, of London. The committee, at their meeting on Tuesday evening last, decided to accept the tender of Messrs. Robinson and Son, of this city, for the first section, which comprises the wall of the south aisle of the chancel. The present dilapidated buttresses will be removed, and their places supplied by new ones, surmounted by crocketed pinnacles. The parapet and cornice will be restored to their original state. The old windows will be taken out, and new jambs, arches, sills, mullions, and tracery substituted. The door and doorway will be replaced by new ones, more in accordance with the style of the building, and the steps entirely reconstructed with the addition of a light, ornamental, iron railing. The wall will be rendered sound and perfect: in short, the whole of this portion of the church will be restored to its original perfection and beauty. The stone for the restoration is the gift of the Marquis of Hertford, and will be obtained from the newly-opened quarry in his park. The dilapidated state of the church has been a source of anxiety for some time, the ravages of time telling fast upon the old red sandstone, more picturesque than durable.

Halifax.—A subscription is being made for the purpose of erecting a large stained glass window in the east part of the parish church here, for which upwards of 1,100*l.* has already been collected.

St. Helier's.—It has been resolved by a committee, according to the *Jersey Times*, "That the monument proposed to be erected to the memory of the late Mr. Le Sueur, consist of an obelisk, of Jersey granite, to be erected in the upper part of Broad-street, if practicable; and that artists—both native and others—be invited to furnish plans and designs for the same, between this time and the 31st day of May, when the designs, with estimates, shall be submitted to this committee for approval, choice, or rejection. That the estimates for the intended work shall be positive and final—and in no case are to exceed the sum of 300*l.*" The committee expressed a wish that the intended obelisk should be so constructed as to admit of a fountain being eventually connected with it. The site recommended, in addition to its general eligibility, is said to be peculiarly desirable, from its contiguity to the spot where the late constable was born.——The same paper states, that the Drains' Committee have opened the tenders sent in for drain-works intended in Sand-street, Seale-street, Castle-street, Charing-cross, and Dumaresq-street. They were five in number, the lowest being that of Mr. Joseph Le Rossignol, who consequently obtained the contract.

Arbroath.—While the Market-place buildings, says the local *Review*, advance at a rapid rate, giving promise of completion in the course of a few months, other extensive improvements and alterations in different parts of the town also deserve notice. These seem to be chiefly manufacturing premises and warehouses on a large scale. It is supposed that 2,000 persons will find employment at all these works. A large space of ground adjoining, but still higher up the Den, has been feued by a manufacturer, who will soon commence building, and both spinning and weaving establishments on an extensive scale will shortly be erected there.

MUNICH—EXHIBITION OF THE ART-UNION.

Amongst the architectural drawings here is the plan for the new Maximilian-street, showing costly structures, which would almost require a Crœsus treasure for their execution. A *dome* with the sepulchres of the royal dynasty, the palace on the Isar-höhe, the Athenæum, and the college for the higher branches of the public service, would be ornaments, which, perhaps, comparatively little Bavaria cannot aspire to.

THE SERVICE OF THE AQUEDUCTS AND FOUNTAINS AT CONSTANTINOPLE.

THE Turkish capital offers the peculiarity that good and salutary regulations *exist* where a mere chaos was hitherto supposed to occupy their place. According to late calculations, based on correct observations and tables, the fifteen systems of sources and water wells which surround Constantinople, and from which numerous aqueducts and cisterns are alimented, yield a daily supply of 249 *lulehs* of water, which is equivalent to 12,267,532 kilogr.; and as the population of the Turkish capital is calculated at 600,000, a daily supply of 2,044 kilogr. for every person indiscriminately is resulting therefrom. The administration and service of this water-supply is confided to an especial class or order of men, the corps of the *Su-Jaldshi* or well-masters. This regularly organised corps exercises a licensed art, and if they possess no theoretical knowledge, still they practise their art according to some traditional rules and principles. To this corps all the works relating to the searching after water, its conducting and distribution, as far as want and even comfort are concerned, are confided. The corporation of the Su-Jaldshi now consists of about 300 Turks and 100 Albanese Greeks, who are exclusively selected from some families of the district of Drinopolis, in the Epirus. The inhabitants of five or six villages emigrate for the sake of occupying the situations of well-masters in Constantinople and other Turkish cities. These industrious people seem to be of Greek origin, and claim the honour of having constructed the aqueduct and canal which formerly conducted the waters of St. George's to Nicopolis, although there is no historical evidence proving it. But it is quite certain that they have erected an aqueduct of 366 arches, which, at the time that Leukadia belonged to the Turks, led spring waters across an arm of the sea to the citadel of St. Marius. Under the Greek emperors, the Lundshids were in the exclusive possession of the rights of well-masters; and the privileges granted to them by the Ottomans were only the consequences of those former rights.

No other Albanese Greek can be preferred to the Lundshids in the appointment of well-master, which always descends from father to son. If the latter is not of age, the corporation assigns him a guardian until he is able to perform his task. If a well-master die without male issue, then in this sole instance the corporation has the right to sell the situation; and the price, which is almost always twenty to thirty *boursis* (10,000 to 15,000 francs), belongs to the widow or her female children. At the head of these Lundshids is the *Su-Nasari* (inspector of water), who is nominated by the Sultan, and mostly one of the subaltern courtiers of the emperor. His salary is 3,000 piastres, besides the revenues and the manorship of the twelve villages, where the principal water-cranks are situated, as Belgrade, Pyrgas, Ponte Piccolo, Litnar, and other places.

THE REGENT'S PARK.—Mr. Editor,—I wish you would point out the lamentable, the disgraceful state of the drainage system and surface of the Regent's-park; also the extravagant and bad manner in which the New-road is repaired with broken granite.—B.

THE PIPE-DRAIN CONTROVERSY.

THE observations in your last number on the discussion of the drainage question at the Architects' Institute, were quite unnecessary to convince the most cursory reader of your journal that the course you have taken has been one of strict impartiality, and likely to conduce to its satisfactory settlement.

My object in now writing is to protest against the very unfair course pursued by the Metropolitan Commissioners of Sewers in permitting those only of their officers who adopt the views of Mr. Bazalgette to publish their statements, and that contrary to existing regulations, which forbid their surveyors to make known any facts or opinions gathered in the discharge of their duties, and for the violation of which orders one of the surveyors was some time back dismissed. In common fairness, either the restrictions imposed should be withdrawn, or applied without distinction.

Mr. Bazalgette commenced his duties as engineer to the commissioners with foregone conclusions, on many of the points under discussion, and his opinion is surely entitled to no more consideration than that of men of such extensive experience and practical knowledge as Mr. John Roe, or than that of many of the present surveyors of the metropolitan commissioners, whose opinions and practice, as far as they are allowed to carry the latter out, differ materially from his.

While the question is being agitated in the metropolis, the surveyors of our large provincial towns are judiciously adopting the pipe system to a large extent, to the advantage of the inhabitants, both on the score of efficiency and economy; and were it not that contending parties are striving to gain the ascendancy in the metropolis, the question would soon be settled by all practical men. It must not be forgotten in this discussion, that on its decision hangs the alternative of drainage or no drainage for many towns not blessed with large resources, and that if the system lately sanctioned by the commissioners had been recognised as the proper one, such places as Tottenham, Rugby, and many others, would have been without sewerage to this day. FAIR PLAY.

THE ARTISTS' GENERAL BENEVOLENT INSTITUTION.

THE dinner, last week, was well attended, and produced a good sum. Mr. Disraeli, who was in the chair, dilated on the peculiarity of the artist-mind, and the time required to produce what is of so much consequence, a sympathising, art-loving public. The council of the Art-Union of London might adopt his speech as a testimonial to the value of their association, if they needed it, but they do not. There was a goodly show of academicians and others,—Lord Dufferin, Sir C. L. Eastlake, Sir W. Ross, Messrs. Roberts, Hardwick, Cockerell, Scott Russell, Uwins, Lewis Pocock, Denham, Robert Bell, Ardin, Durham, Millais, Elmore, Creswick, and others. It was rather a slow affair, after all. Is there no one in London with a genius for public dining who could give committees a few hints as to management, or are they too obstinate to learn?

COMBUSTIBLE PARAPETS AND ENCLOSURES UNDER METROPOLITAN BUILDINGS ACT.

As the irregularity to which the following award relates appears to be becoming general, the publication of the decision may be of use. In the case of six houses in King Henry's-walk, Ball's Pond-road, district of South Islington, built by Mr. John Glenn, the shops of five of them extend about 6 feet 6 inches beyond the wall of the upper part of the building and are covered with a flat, and the shop of the sixth (the corner house) extends beyond the flank wall also. The builder had constructed the upper part of the front enclosure of the shops, between the party walls, of timber, lathed and cemented, which formed the entablature, &c. and stood as a parapet several feet above the flat in each case. At the corner house this parapet continued round part of the flank also. The district-surveyor, not considering himself competent to permit this, gave notice of irregularity on the grounds that the external walls or enclosures were not of sound bricks or of stone as required by schedule D, part 2, and that the parapets were not of incombustible materials as required by schedule E. Ultimately the matter was taken to the referees, and they awarded that the enclosures (including parapets and cornices) were contrary to the directions and provisions of the Buildings Act, and they directed Mr. Glenn forthwith to amend the irregularities.

Fees of the office, 2*l.* 12s. 3d. and 1*l.* 1s. to surveyor, to be paid by the builder.

MASTERS AND MEN.

Willin v. *Clark*.—This was an action brought in the Westminster County Court, to recover the sum of 6s. due to the plaintiff from Mr. Clark, the engineer, of the Strand. The facts of the case, as stated by the plaintiff, were, that he was employed by the defendant as an engineer, and that about a month since he left the defendant's employ on the Saturday evening; that in the time-table made up by him there was an omission of two hours (1s.), and that it was the defendant's custom to retain in hand one day's wages (5s.), making together 6s. the amount of the present claim. The defendant stated that Willin had left him without notice, and that it was his custom to give *his men a week's notice and to require it*, and consequently that the amount of this claim was forfeited; but, on cross-examination, he admitted that the custom pursued by him was not universally practised.

His Honour (Bayley) said he regretted very much that some fixed rule did not prevail as to giving and receiving notice, but as the custom of the defendant (a very fair one) was not in universal practice, it was not binding upon the plaintiff, and he must, therefore, make an order for payment of the amount claimed.

Notices of Books.

The Three Days of Wensleydale; the Valley of the Yore. By W. G. M. JONES BARKER. London: Dolman. Paternoster-row. 1854.

THIS is a pleasantly-written account of that celebrated district in Yorkshire (Richmond), in which once were resident kings and king-makers, princes and bishops, and which still contains many interesting architectural records of its early condition,—"history in ruins." The three Days alluded to are the Roman Catholic Day, the Day of change, and the present Day. The author, a Romanist apparently, dwells with enthusiasm on the "glories" of the first of the three. In the introduction it is remarked that, pending a more elaborate history which the author contemplates, "a little book was evidently required which should furnish a concise account of all the most interesting objects, and to a certain extent a review of former times, at a price adapted to the poor as well as to the rich man's purse; a book which might equally find its way to the esquire's drawing-room-table and to the humble book-shelf of the hardy peasant dalesman who desires to know something of his 'forelders' nomes and deeds." The deficiency thus felt he hopes his three chapters will to a great extent supply.

The Mariners' Daily Assistant; with Rules for Finding the Latitude, &c. and an Appendix, containing an extensive Set of requisite Tables. By WILLIAM TURNBULL. Imray and Son, Nautical Book and Chart Publishers, 102, Minories. 1854.

THIS appears to be a very complete work of the kind; made up, if the aspect of the whole do not deceive us, from two separate works, one being in form of an elaborate and extensive appendix of tables. Our readers are well acquainted with the merits of "W. T.'s" mathematical labours, which, therefore, need no special recommendation here.

The author, a self-taught country labourer, is also the writer of many other volumes on scientific subjects, many of which we have seen ourselves: some of them are published in other names; but our author claims the merit of their preparation.

We must here remark, however, though not meaning it to apply to Mr. Turnbull's case, that if an author, for a consideration, dispose of his name, or rather of his labours as a man of science, to another, without express understanding that if or when published the real author's name must be given, he really has no business afterwards to complain of the omission.

VARIORUM.

For "Murray's Railway Reading," a second series of "Essays from the *Times*," has been published, including the papers on Layard, Lord Mansfield, Gordon Cumming, John Sterling, Chantrey, the Greeks, Dickens, and Thackeray, and a very charming volume it makes. Another of the volumes is devoted to a second series of "Deeds of Naval Daring," by Edward Giffard, which falls in with and keeps up the present popular feeling in favour of our gallant navy.

Miscellanea.

METROPOLITAN SEWERS COMMISSION.—A general Court of Commissioners was held last week at Greek-street; when the secretary reported that the available balance in the hands of the treasurer amounted to 34,958*l.* 8s. 9d. and the deposit account was 40,000*l.* The Court then proceeded to order some district rates of 6d. in the pound to be made, when Colonel Dawson and other Commissioners expressed some impatience at their present position, voting away money and performing duties after notice of resignation. They wished to know what progress the Government were making with the reconstitution of the Commission. The chairman said that the Government intended as soon as they could this session, to bring in a Bill for the reconstitution of the Commission, and the amendment of the law relating to it. That Bill was now under the consideration of the Government. He could say there was no wish on the part of the Government to get rid of the present commissioners, or to control them in the exercise of the power the law had given to them, although some change was contemplated. So long as the commissioners continued to exercise the power given to them under the Act of Parliament they must do so according to their conscientious convictions, and in no other way. He was sorry to differ from his colleagues. He could not altogether acquiesce in the view they had taken of the meaning of the Government communication sent from the Home-office. He could not look upon the letter sent from the Home-office as implying a want of confidence in the Commissioners. The interpretation he put upon it was, although he was not authorised in putting this construction upon it, that Lord Palmerston wished, by this letter, to elicit from the Commisssioners an expression of opinion as to the best course of drainage, as proposed by the Board of Health.

STOURBRIDGE SCHOOL OF DESIGN.—The annual meeting of this institution was held on Monday week. There was a good attendance. Mr. J. H. H. Foley, M.P. was called to the chair, and introduced the business of the meeting in an appropriate speech, after which he distributed the prizes to the successful candidates. This institution, which has now been in existence for three years, is about to suffer some change. The Government, which has hitherto given a liberal support to it, will now withdraw its grant toward the salary of the master, considering that it ought now to maintain itself. The Board of Trade has appointed Mr. McCallum, the master (to whom the students have presented a memorial), to make a tour in Italy, and a new master is therefore engaged. The students are being sought after to fill good situations where a thorough knowledge of practical art is required. During the past year there have been 120 male and 30 female students. The financial statement showed that during the past year the receipts had been 240*l.* 16s. 10d. and the disbursements, 220*l.* 8s. 7½d. leaving a small balance in hand; but against this there were liabilities amounting to 80*l.* 12s. 6d. Still the Institution was in a better position than at the close of the previous year.

THAMES TUNNEL.—At the commemoration of the opening of the Tunnel the other day, 16,539 passengers passed through it, and the sum received was 68*l.* 18s. 3d.

THE SEWER ACCIDENT AT CHELSEA.—Having read in the *Builder* paragraphs relating to the sewer accident at Paradise-walk, Chelsea, in February, I trust you will inform your readers that at a meeting of the persons who took an interest in the welfare of the poor widows of the unfortunate men that were killed, it was unanimously agreed, after having a list of contributions handed to the chairman by Mr. Eldred, the treasurer, amounting to 90*l.* 7s. 8d. to place half that amount in the Chelsea Savings-Bank in the names of each widow, and of a trustee named by them, and approved by the treasurer. So that when an opportunity offered either of them to lay it out for her own benefit, they might do so.—JOHN CULLON.

THE DECIMAL SYSTEM IN COINAGE, WEIGHTS, AND MEASURES.—On 14th and 28th ult. a discussion took place at the Institution of Civil Engineers, on Mr. Yates's paper on this subject, when the diversity of opinion seemed to accord pretty well with the multiplicity of particular schemes by which the decimal system seems to stand a chance of being swamped. The report gives no clue to individual opinions and suggestions. It is to be hoped that some order will come out of the chaos presently, but for our own part, although we could readily add to the confusion by suggestions, and some of them very good ones, too, in some respects, from our own correspondents, we think it desirable to be very wary how we lend our aid to swamp a very useful and excellent general principle.

HOUSES FOR WORKMEN IN FRANCE.—The *Moniteur*, according to the *Times*, contains a long report from the Minister of the Interior to the Emperor on the employment of part of the credit of 10,000,000f. allowed for the improvement of the lodgings of workmen in large manufacturing towns, by the decrees of the 22nd of January and the 27th of March, 1852. It states that a subvention of 200,000 f. has been granted to the "Cité Napoléon," in Paris, the first workmen's lodging-house that was built; that Messrs. Péreire have contracted to build workmen's lodging-houses to the amount of 4,550,000 f. on condition of receiving a subvention from the Government equal to one-third of the expense, and that they have already constructed two large buildings, one at La Chapelle, and the other at the Batignolles, in which they are bound to let single bed-rooms for unmarried men at 20 c. a night, and apartments for married couples at 7 f. 50 c. per superficial yard per annum; that M. de Heckeren, senator, and M. Kennard have also contracted to build lodging-houses to the amount of 4,140,000 f. on receiving a subvention equal to one-third of the expense, and that they are raising a vast edifice in the Rue de Montreuil; and that Messrs. Puteaux, who have obtained a recompense for the first plans, have already built four houses on the Boulevard Mazas, and are constructing six others at the Batignolles and at Grenelle. The accommodation already provided in Paris consists, it says, of 5,300 lodgings for unmarried and 800 for married workmen.

THE LABOUR QUESTION.—About 150 of the joiners of Hull are still on strike, and the dispute between them and their employers presents no appearance of coming to a termination. Several of the smaller masters, who employ about fifty hands, have complied with the advance demanded—6d. per day; and about twenty other men have left the town, but the great body of workmen are still on strike.—— A short time ago the operative masons of Liverpool addressed a note to their employers, respectfully asking an advance of wages. The employers responded by soliciting an interview with the operatives as early as possible, to converse together and make such overtures as might avert the baneful effects of a strike or turn out. The result was an amicable arrangement of the amount of wages.

ENHANCED VALUE OF ENGLISH TIMBER.—At a wood sale in the plantations of Mr. R. B. Barrow, of Sydnope, recently, says a Derbyshire paper, the number of purchasers was greater than at any similar sale for years past, and Mr. Poyser, the auctioneer, knocked down 126 lots, chiefly larch and Scotch poles, to eager buyers in about three hours, at prices which in the aggregate realised fully forty per cent. above the sum at which the timber had been valued by competent judges. A correspondent states that 5d. per foot has been refused for Scotch poles, containing 2 feet or over, while a few years ago, the same descriptions of wood might have been obtained at from one penny to three halfpence. The advanced price of foreign timber, no doubt, throws more English into use, rendering it more in request.

BRONZES IN PARIS.—In Paris, according to *The Leader*, they are taking bronze casts of the Venus of Milo, for the principal public gardens, and a few museums in the departments. Shall we incur the charge of Vandalism, says the paper we quote, if we express a wish that Louis Napoleon had ordered this beautiful torso to be promoted, in the copies, to a complete form? At all events, the Vandals who only desire to *restore* the missing limbs of statuary should be lightly censured. Other bronzes are in process of casting, and, when complete, will occupy conspicuous positions. The statues of Francis I. Louis XIV. and *the* Emperor—all to be executed in Florentine bronze—will adorn the court of the Louvre and the Carrousel. A colossal statue of Louis XVI. by Raggi, is warehoused somewhere near the Champs de Mars, waiting orders for a final destination. This statue is of vast dimensions, being fully 20 feet high. It represents the king in his state robes, *fleur-de-lys* bespangled. His majesty holds in one hand a plumed hat, the charter in the other, and appears to weigh both very attentively.

THE ART-UNION OF LONDON.—The distribution will take place at the Lyceum Theatre, on Tuesday morning, the 25th inst. Lord Monteagle in the chair.

GALVANO-PLASTIC NIELLO.—Niello, a peculiar style of enamelling, consists in engraving or stamping figures on a plate of silver or gold, and then filling the incised lines, or impressed pattern, with a sort of enamel, differing, however, from true enamel, which is a kind of glass, by being formed of a mixture of the sulphurets of lead, silver, and copper. This mixture is of a black colour—hence the name niello from nigellum, derived from niger, black—and when melted into the intaglio parts of a plate, gives it somewhat the appearance of an inked engraved copper plate. A new kind of niello work has lately been introduced on the Continent, in which, however, the figures are not produced by an enamel of sulphuret of silver, as in the true niello, but by a different coloured metal: thus on a plate of gold may be produced fine engravings, the lines of which are in silver, and so on. * * * Many highly ornamental and useful applications might be made of these processes, especially in the manufacture of church furniture. Instead of simply engraving the name and legend upon pieces of plate presented to persons, it might be put in letters of gold at very little more expense.—*Mining Journal.*

NORTH OXFORDSHIRE ARCHÆOLOGICAL SOCIETY.—The quarterly meeting of this institution was held in the Mechanics' Institute, Banbury, on Tuesday in last week, and was attended by a large number of ladies and gentlemen. Four papers were read, and the table was spread with a great many articles illustrative of the subjects brought before the society. On the motion of the Rev. W. S. Miller, the Rev. E. Payne took the chair. The Chairman expressed his pleasure at seeing so many ladies in this meeting, and hoped they would be induced to become members of the society. The programme, he believed, was this—he should first have to call upon an individual to whom he need not further allude at present [the chairman himself] to read a paper on a subject connected with the execution of Charles I. and a letter illustrating that wretched scene. The second paper was to have been read by their president, Lord Alwyne Compton, who had sent his paper to Mr. Miller to be read; but his lordship could not be here himself. That paper was "On the civil Wars and the Siege of Banbury." The third, by Mr. Rye, was to be "On Madmarston Camp." The fourth and last, by Mr. E. G. Bruton, "On the Value and Importance of Archæology, and its Influence on Decorative and Ornamental Art." There were several articles on the table connected with these subjects. The several papers were then read: they are reported in the *Banbury Guardian*.

THE BATH SCHOOL OF ART.—The executive committee for promoting the establishment of a school of design in Bath, says the local *Chronicle*, feel themselves sufficiently assured of success in their praiseworthy undertaking to apply at once for the series of examples and models recommended by Mr. Cole in his recent address. A certificated master has been appointed, and is, we believe, already arrived, to superintend the preparation of the central schoolroom, when the various classes will be at once received. There is every promise of a very sufficient supply of pupils. The West of England has always contributed its full share, and rather more, of men eminent for high artistic feeling. Reynolds, Lawrence, Baily, Pyne, Rippingille, Barker, Müller, and Willes Maddox were, and, possibly of some we may say, still are among the brightest ornaments of the English school of art. Mr. Cole remarked in his address, that the practice of careful drawing was almost invariably attended with a habit of truthful speaking; and if this be so, how could we by possibility adduce a better or stronger motive in favour of making such a study a part of general education? But we feel that it leads, under proper guidance, to an intensity and purity of reflection which may do much in exalting the mind of the most rude and uncivilized; and we feel that by directing a boy's thoughts to the beautiful proportions of the human figure, the exquisite expression of the human countenance, the wonderful adaptation to all the purposes of animal existence in the frame of the brute creation, the infinite and graceful variety of forms and combinations in foliage—in short, to the grace and symmetry of all God's works, we may raise his feelings from the degraded level in which we too frequently find them, and he will then abhor the language and the mischief he now delights in. In order to place the Bath project on a sure foundation, it is necessary to raise a sum of about 150*l.* to purchase materials, casts, &c. a very insignificant sum for so important a purpose in such a city as Bath, and one which we should expect will be freely placed at the disposal of the committee in a few days. Subscriptions are being received at all the Bath Libraries and at the Somersetshire Bank.

LECTURE ON OUR IRON MANUFACTURE.—At Walsall, on Monday before last, Mr. S. H. Blackwell, of Dudley, delivered a lecture on this subject to the members of the Walsall Library and Philosophical Institution. In noticing the increased quantity of iron produced in this country—the quantity (1,800,000 tons) exported last year, being three times the entire "make" of the kingdom twenty-eight years ago—he said, that proportionate with the increase of requirements was the increase of resources. The Great Exhibition had led to the discovery of ores not before known to exist in North Yorkshire, Northamptonshire, West Somerset, and Devonshire. The yield in Northamptonshire was very great, and he was himself procuring there from 15,000 to 20,000 tons per week. To produce the three million tons of iron which would be manufactured in England this year, there would be required eight million tons of coal, from twelve to fourteen million tons of coal, two million of lime, and of the other material, air, between thirty and forty million tons. There was every reason to believe that the demand would increase in the succeeding as rapidly as it had increased in the past twenty-five years. In every one of the places in England in which new iron-making resources were discovered, there were invariably found traces of the workings of the "old men," for it could not be ascertained at what date these workings were made.

SUNDAY SCHOOLS AT HAVERSTOCK-HILL are to be built, Mr. Edward Gotto, architect. Tenders varying from 747*l.* to 509*l.* have been received; and the latter, from Humphreys and Son, accepted.

INDEPENDENT CHAPEL, HASLINGDEN: COMPETITION.—The committee had forty-nine designs submitted to them, and, after examination, those found afterwards to be by Messrs. Cooper and Peak, of London, were selected. The 10*l.* premium offered for the second best set of drawings was awarded to Messrs. T. Mallinson and Son, of Nottingham.

DRAINAGE TENDERS.—The following tenders have been sent in to the Local Board of Health for Dover Drainage and Waterworks. We do not pretend to understand the principles which guide estimators:—

P. Ayers, Dover	£31,088
G. Fry, Dover	27,539
King and Tester, Ashford	25,183
Diggle, Dover	24,964
Oldham, Dover	24,817
Dean and Co. Walmer	24,171
Buxton, Leeds	24,033
Nightingail and Bushel, Dover	22,544
Stiff, Dover	21,749
Smith, Woolwich	21,255
Moxon and Co. Brompton (accepted)	21,071
Varley, Birmingham	15,852

TENDERS

For the erection of a warehouse in Cannon-street, for Messrs. Berens, Blomberg, and Co. Mr. Hosking, Architect.

Kelk	£19,789	0	0
Locke and Nesham	19,622	0	0
Lucas, Brothers	18,750	0	0
W. Cubitt and Co.	18,390	0	0
Holland	18,390	0	0
Higgs and Cullingford	18,354	0	0
Lawrence	18,347	0	0
Jay	18,093	0	0
Grimsdell	17,945	0	0
Myers	16,920	0	0

For the Islington Poor Establishment. Quantities prepared by Mr. Yeldham and Messrs. Batstone and Hunt. Mr. John Jones, Architect.

Lawrence and Son	£5,355	0	0
Locke and Nesham	5,310	0	0
Dove, Brothers	5,275	0	0
John Glenn	4,680	0	0
Carter and Ellis	4,376	0	0

TO CORRESPONDENTS.

"B. L." "C. L." "Wren," "Unshorn Clerk," "B. W." "P. M. H." "H. W." (the salaries vary according to circumstances), "T. H. H." "Compasses," "Colour-box," "W. S." (the subject is before us), "G. H." "W. T." "J. R." "A Mechanic," "Hartlepool" (shall appear), "T. W. O." "J. M." (we shall be glad to see report), "Crito," "R. L." "J. M." "T. J. P." (we are compelled to decline), "J. D. D." (letter-writing is out of the question. Include as many building trades as seem desirable), "J. W." "T. W. O." (we have no liking for cesspools).

"*Books and Addresses.*"—We have not time to point out books or find addresses.

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